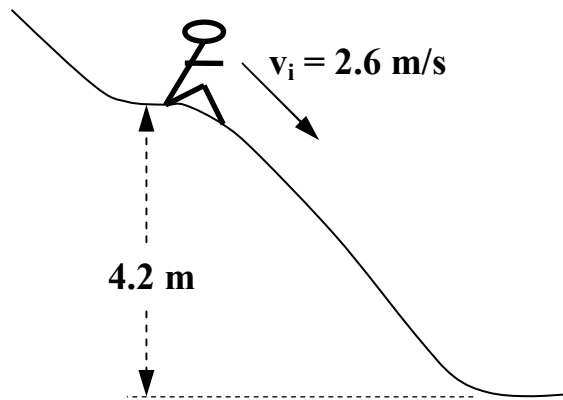


Example #15: Consider the diagram to the right showing a 60 kg student on a large slide.



- a) In the absence of friction, what would her speed be at the bottom?
- b) If her actual speed at the bottom is 6.0 m/s, how much heat was generated on the section shown?

$$\begin{aligned} \text{a) at start, } E_T &= E_p + E_k \\ &= 60(9.8)(4.2) + \frac{1}{2}(60)(2.6)^2 \\ &= 2672.4 \text{ J} \end{aligned}$$

$$\begin{aligned} \text{at bottom, } E_T &= E_k \\ 2672.4 &= \frac{1}{2}(60)v^2 \end{aligned}$$

$$v = 9.4 \text{ m/s}$$

$$\begin{aligned} \text{b) at bottom: } E_T &= E_k + \text{heat} \\ 2672.4 &= \frac{1}{2}(60)(6)^2 + \text{heat} \end{aligned}$$

$$\text{heat} = 1.6 \times 10^3 \text{ J}$$